



# Cambridge International AS & A Level

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## MATHEMATICS

9709/22

Paper 2 Pure Mathematics 2

February/March 2026

1 hour 15 minutes

You must answer on the question paper.

You will need: List of formulae (MF19)

### INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen. Do **not** use correction fluid or tape.
- Do **not** write on any bar codes.
- If additional space is needed, you should use the lined page at the end of this booklet; the question number or numbers must be clearly shown.
- You should use a calculator where appropriate.
- You must show all necessary working clearly; no marks will be given for unsupported answers from a calculator.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.

### INFORMATION

- The total mark for this paper is 50.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **16** pages. Any blank pages are indicated.



DO NOT WRITE IN THIS MARGIN

[3]

[illegible]

- 2 (a) Sketch, on the same diagram, the graphs of  $y = |3x - 4|$  and  $y = 7 - 10x$ .

[2]

- (b) Solve the equation  $|3x - 4| = 7 - 10x$ .

[2]

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- (c) Hence, solve the equation  $|3^{2t+1} - 4| = 7 - 10 \times 3^{2t}$ . Give your answer correct to 3 significant figures.

[2]

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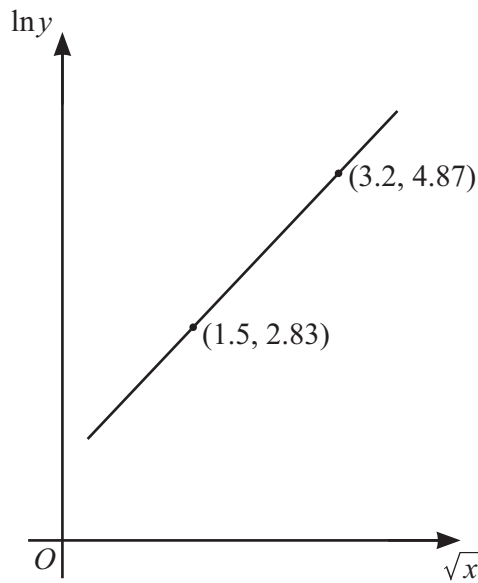
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3



The variables  $x$  and  $y$  satisfy the equation  $y = ke^{a\sqrt{x}}$ , where  $k$  and  $a$  are positive constants.

The graph of  $\ln y$  against  $\sqrt{x}$  is a straight line passing through the points  $(1.5, 2.83)$  and  $(3.2, 4.87)$ , as shown in the diagram.

Find the values of  $k$  and  $a$  correct to 1 decimal place.

[5]

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**4** A curve has equation

$$(x^2 - 3)\cos y + 4\cos^3 y = 1.$$

Find the exact gradient of the curve at the point  $\left(2, \frac{1}{3}\pi\right)$ .

[6]

[illegible]



5 The polynomial  $p(x)$  is defined by

$$p(x) = ax^3 + x^2 + (a+1)x + 1,$$

where  $a$  is a constant. It is given that the remainder is  $-3$  when  $p(x)$  is divided by  $(2x+1)$ .

(a) Find the value of  $a$ .

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(b) Hence, factorise the expression  $p(x) + 3$ .

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- (c) Solve the equation  $\sin\left(\frac{1}{2 + \operatorname{cosec} \theta}\right) + 3 = 0$  to find the least positive value of  $\theta$  in degrees. [2]

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6 Find the exact value of  $\int_{\frac{1}{6}\pi}^{\frac{1}{3}\pi} (4 \cos^2 2x + 3 \tan^2 x) dx$ .

[6]

This image shows a full page of white paper with horizontal dotted lines, typical of primary school handwriting practice paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



This image shows a full page of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting or typing. There are no margins, text, or other markings on the page.



7 It is given that  $\int_a^{2a} \frac{1}{4} e^{2x} (2 + e^{-x}) dx = 50$ , where  $a$  is a positive constant.

(a) Show that  $a = \frac{1}{4} \ln(200 + e^a)$ . [5]

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(b) Show by calculation that the value of  $a$  lies between 1.0 and 1.5.

[2]

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(c) Use an iterative formula, based on the equation in 7(a), to find the value of  $a$  correct to 4 significant figures. Give the result of each iteration to 6 significant figures.

[3]

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**8** A curve has equation

$$y = \frac{10 + 2 \ln x}{1 + \ln x}.$$

The point on the curve for which  $y = 4$  is denoted by  $P$ . The tangent to the curve at  $P$  meets the  $x$ -axis at the point  $Q$ .

Find the exact  $x$ -coordinate of  $Q$ .

[8]

This image shows a full page of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page, providing a template for handwriting practice or general writing. There are no margins, text, or other markings on the page.

[illegible]



If you use the following page to complete the answer to any question, the question number must be clearly shown.

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